Draft (For Discussion Only)

NERT EE/CA for SNWA Weir Dewatering Project

Justification for Selection of Perchlorate Treatment Method and Capacity

Selection of Method: Strong Base Anion Exchange Resin (Ion Exchange) vs Biological Treatment Plant

- Single plant location was selected to minimize costs and disturbance along the Las Vegas Wash (LVW). The alternative evaluated was for one plant at each weir location which would have increased both capital and Operation & Maintenance costs. The NDEP previously removed this option from consideration. Location of the single plant was selected to be collocated with the existing NERT Lift Station #1.
- One pump station will be placed at each weir to be constructed; Sunrise Mountain and Historic Lateral to deliver the groundwater to the treatment plan. Above ground piping from the two weirs will deliver the water from the pump stations to the centralized plant.
- Both Ion Exchange and Biological Treatment were considered as alternatives for the treatment plant. Ion Exchange was selected as the treatment method for the following reasons:
    - Ion Exchange is a proven technology to treat varying influent flow rates including zero flow, a scenario which is likely based on historic weir construction practices. The bacteria in the biological plant would not survive periods of zero or no flow conditions without the ability to enter recirculation mode which would require a 10 million gallon equalization tank or pond. Ten million gallons is approximately one operating day for both weirs dewatering simultaneous, again a likely scenario given historic weir construction practices
    - Ion Exchange is able to treat perchlorate concentrations over a large range, i.e.,ranging from 0.05 parts per million (ppm) to 500 ppm. A biological plant does not operate effectively when influent concentrations fluctuate and the biological plant becomes less cost effective at lower concentrations. Influent concentrations are expected to be below 1.8 ppm;
    - Construction of an Ion Exchange plant requires considerably less time to construct when compared to a biological plant. Construction must be completed and the plant must be ready to receive water no later than June 1, 2017. There is not sufficient time to complete construction of a biological plant;
    - Capital cost of constructing an Ion Exchange plant were evaluated to be 50% less expensive than the costs for constructing a Biological Plant;
    - The footprint of the Ion Exchange plant is fairly compact when compared to the biological plant and the associated equalization tank(s) or pond(s) and ancillary equipment. Basic Environmental Company (BEC) will provide limited temporary access that would not include space for large tanks or ponds. Additionally the smaller the footprint the more visually acceptable in this area near the Clark County Pabco Trailhead Park and nature trails;
    - There is a lower risk of having an excursion of Secondary Standards (visual and odor) using the Ion Exchange system.

Selection of System Capacity: 5,000 gallons per minute (gpm) vs 6,900 gpm

- When considering the capacity of the Ion Exchange system two options were considered; a 5,000 gpm maximum option and a 6,900 gpm maximum option. The 6,900 gpm maximum option was selected for the following reasons:
    - The NDEP and the SNWA compared the Sunrise Mountain Weir and the Historic Lateral Weir dewatering rates to the previous neighboring weir dewatering projects:
        - Sunrise Mountain Weir will be installed downstream of Upper Narrows Weir which had a maximum daily average flow rate of 2,453 gpm (the instantaneous peak flow rate was not recorded or observed);
        - Historic Lateral Weir will be installed upstream of Bostic Weir which had a maximum daily average flow rate of 3992 gpm.

      Because the Sunrise Mountain and Historic Lateral Weirs are in similar locations along the Las Vegas Wash the expected combined maximum daily average flow rate could have been as high as 6,445 gpm if dewatered at the same time which has been the historic weir construction practice.
    - Backwaters (pooling) is a concern when constructing in close proximity to existing weirs. This can cause surface water beyond the construction area to pool and rise which can impact pumping flow rates and cause flooding. This has been observed at previous weir construction projects, namely the Upper Narrows Weir.
    - Storm events will also increase the flow rates during dewatering where surface waters will enter the dewatering excavation(s). The C-1 Flood Channel enters the Las Vegas Wash in the middle of the Historic Lateral Weir project which can flow at 150 cubic feet per second in an "average" storm event. The higher 6,900 gpm flow rate will allow additional capacity in storm events.
    - Lower dewatering flow rates would extend the length of the weir construction project(s) causing additional risk of physical damage and delay to the project in the event of a major storm event.